very high tide of the 23d.

New York City: the highest tide known for forty-five years sewers overflowing. At 10 a. m. the water had reached a the East River was higher than for a quarter of a century. The Harlem River rose three feet and eight inches above high-water Wharves along the Hudson River, as far as Poughkeepsie, were flooded.

Long Branch, New Jersey, 24th: the damage caused by high tides along this part of the New Jersey coast is very heavy;

bathing houses were washed away, and wharves badly damaged. Cape Mendocino, California: the highest tide ever known in Humboldt county occurred on the 24th; the water backed up to a great distance on every side from the main rivers; from the adjoining hills the lowlands looked like a vast ocean. At Eureka the lumber mills were compelled to shut down, the water overflowing the wharves. Thousands of acres supposed to have been above high-water mark were inundated.

Pysht, Washington Territory, 24th: an unusually high tide

at 2 p. m.; the highest known for several years.

Chatham, Massachusetts: an unusually high tide occurred

on the 24th; Chatham beach was almost submerged.

Atlantic City, New Jersey, 24th: the tide this morning is the heaviest for years. Much damage was done to property along the ocean front.

Cape May, New Jersey: very high tides occurred on the 23d and 24th. Much of the beach front was washed away, and wharves, etc., demolished and carried out to sea. Railroad travel was suspended on account of the high water.

New Haven, Connecticut: the highest tide in twenty-nine vears occurred on the 24th; it rose three feet above high-water mark, and covered the warves.

High tides also occurred at the following places:

Portland, Maine, 24th, 25th. Eastport, Maine, 24th, 25th, 26th. Narragansett Pier, Rhode Island, 24th. Chincoteague, Virginia, 23d, 24th. Sandy Hook, New Jersey, 23d, 24th. Cedar Keys, Florida, 22d. Pysht, Washington Territory, 23d.

Tatoosh Island, Washington Territory, 7th.

Taunton, Massachusetts, 24th, 25th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for November, 1885, with the telegraphic reports for the succeeding thirty-two hours, shows the general average percentage of verifications to be 79.90 per cent. The percentages for the four elements are: Weather, 84.25; direction of the wind, 76.88; temperature, 77.23; barometer, 84.83 per cent. By geographical districts, they are: For New England, 75.48; middle Atlantic states, 83.01; south Atlantic states, 85.28; eastern Gulf states, 84.15; western Gulf states, 82.27; lower lake region, 77.27; upper lake region, 76.66; Ohio Valley and Tennessee, 82.31; upper Mississippi valley, 76.11; Missouri Valley, 77.17. There were twenty-four omissions to predict, out of 2,934, or 0.82 per cent. Of the 2,910 predictions that have been made, one hundred and twenty-seven, or 4.36 per cent., are considered to have entirely failed; one hundred and forty-eight, or 5.09 per cent., were one-fourth verified; four hundred and forty-nine, or 15.43 per cent., were one-half verified; four hundred and eighty-nine, or 16.80 per cent., were three-fourths verified; 1,697, or 58.32 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

The percentages of verifications of special predictions for

certain localities are, as follows:

Omaha, Nebraska (twenty-five days), 84.69; Arkansas, twenty-five days), 82.00; Tennessee (twenty-four days), 84.26;

Newport. Rhode Island: the wharves were flooded by the nine days), 79.31; Baltimore, Maryland (twenty-eight days), 86.11; Erie, Pennsylvania, 66.25; Boston, Massachusetts, 77.50; Portland, Maine (twenty-nine days), 72.41; Albany, occurred on the 24th; much damage resulted from cellars and New York, 81.67; Pittsburg, Pennsylvania, 66.67; Cincinnati, Ohio, 77.50; Louisville, Kentucky, 83.33; Columbus, Ohio, mark four inches higher than the flood of February, 1885, when 71.67; Cleveland, Ohio, 57.64; Indiana, 83.33; Oswego, New York, 63.33; Rochester, New York, 63.33; Buffalo, New York, 62.50; Milwaukee, Wisconsin, 73.33; Chicago, Illinois, 76.67; Detroit, Michigan, 74.17; Toledo, Ohio, 73.33; Sandusky, Ohio, 67.50; Cairo, Illinois, 87.71; Saint Louis, Missouri, 88.56; Memphis, Tennessee, 80.83: Shreveport, Louisiana, 87.91; Iowa (twenty-nine days), 76.21.

CAUTIONARY SIGNALS.

During November, 1885, two hundred and fourteen cautionary signals were ordered. Of these, one hundred and fiftyeight, or 73.83 per cent., were justified by winds of twenty-five miles or more per hour, at or within one hundred miles of the station. Sixty-two cautionary off-shore signals were ordered, of which number, forty, or 64.52 per cent., were fully justified both as to direction and velocity; fifty-six, or 90.32 per cent., were justified as to direction, and forty-eight, or 77.42 per cent. were justified as to velocity. Two hundred and seventysix signals of all kinds were ordered, one hundred and ninetyeight, or 71.74 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary offshore signals, forty-one were changed from cautionary signals. Five signals were ordered late. In forty-two cases, winds of twenty-five miles or more per hour were reported for which no signals were ordered.

COLD-WAVE SIGNALS.

During the month there were one hundred and fifty cold-Of these, there were one hundred wave signals displayed. and twenty-six, or 84.0 per cent., justified. In eight cases the signals were considered to have been ordered late.

RAILWAY WEATHER SIGNALS

Prof. P. H. Mell, jr., director of the "Alabama Weather Service," in the report for November, 1885, states:

The verifications of predictions for the whole area was 86 per cent. for

temperature, and 90 per cent. for weather.

temperature, and 90 per cent. for weather.

The following roads comprise this system: Western of Alabama; South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia system in Alabama; Memphis and Charleston; Columbus Western; Atlanta and West Point of Georgia; Northeastern of Georgia; Atlanta and Charlotte Air Line; Western and Atlantic; Georgia; East Tennessee, Virginia and Georgia system in Georgia; and Savannah, Florida and Western.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays occurred during November, as follows: Alpena, Michigan, 7th: an aurora was observed at 7.20 p.

m., consisting of a diffused light, resting on a dark segment, from which a few small streamers, having an apparent motion from east to west, were noted; the display disappeared at 10.30

Mackinaw City, Michigan, 7th: an aurora was observed from 9.30 to 10.30 p. m., consisting of a segment above a bank of clouds of 30° altitude; the light was of a pale yellow color; occasionally a streamer was observed to shoot up above the clouds to an altitude of 65°. At 10 p. m. the sky became obscured.

Fort Buford, Dakota, 7th: an aurora, consisting of a pale white light, was visible from 9.22 p.m. until near midnight; the sky was obscured at intervals.

Fort Totten, Dakota, 7th: an auroral light, of pale yellow color, was observed in the north from 8 to 11 p.m.; the display was partially obscured by clouds.

Fort Sully, Dakota, 7th: there was a faint auroral glow in

the north between 8 p. m. and 12.30 a. m. of the 8th.

Fort Bennett, Dakota, 7th: a faint auroral light was ob-Georgia (twenty-five days), 86.50; Washington City (twenty-served between 8.10 and 11.30 p. m., in the north-northeast, ${\it Table~of~miscellaneous~meteorological~data~for~November,~1885-Signal~Service~observations.}$

	- 180g	A		pheric	pressu	re (in inc			orological data for November, 1885—Signal Ser Temperature of the air (in degrees Fahrenheit).											Ī	OUSE		norms.	i	Wi	nds,				
	n shove level.	<u></u>	from .	p .	R	xtr	emes.		meter.	B.B.	from			Ext	remes,			Dail	ly ra	nge	humidity.	oint.	ير		 6 2	- Lec		aximi elocit		days.	ays.
Stations.	Elevation a leve	Mean actual rometer.	Departure f	Mean reduced barometer.	Highest barometer	Date.	Lowest barometer	Date.	of baromet	Monthly mean,	Departure f normal.	Мах.	Date.	Mean max	Min. Date.	Mean min.	Monthly range.	Greatest.	Date.	Least.	rel.	Mean dew-point	Precipitation	Departure from	Total movement.	Prevailing direc-	Miles p. b.	a a	Date.	No. of cloudy	No. of fair days.
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Narragansett Pier New Haven	107	29.81		29.92	30.32	27	29.53	250		15.1¦- 12.4¦-	- - 1.7	68.0	12	52.3 49.5	23.0 29 19.1 28	38.0 35.6	45.0 45.7	23.4	5	.02	4 75 - 8	34.8	2.34 3.49	— 1.50 — 0.51	6,837	n.	32		21		13 6
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Eastern Gulf States.	1, 129	28.87	—.13	30.06	30.35	27	29.70	 22 _. 0	.66	0.2	- 1.2	73.0	6	58.5	29.2 26	42.5	43.8	26.8	10, 5	.8 2	69.9	39.4	3.98	- 0.69	7,365	nw.		nw.	23 12	5	14 11
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San Antonio	781	29.24		30.03	30.32	13	29. 51	50	.81	0.7	- 2.5	86.8 	5	74.0	34.2 29	49.2	52.6	36.3	14 10	.7 20	6r.8	44.9	0.70	— 1 .2 3	5, 204	n.	26	D.	12 1	8 1	III
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Chattanooga Knoxville	783 980	29.24 20.01	13	30.06 30.06	30.37	27	29.64 20.66	220	-73 4	8.4 6.8	- I.2	71.I 73.5	II	58.0 55.8	29.2 26 29.3 27	40.2	41.9 44.2	32.7	21 5. U 3	.0 .8 2	72.3	38.4 38.7	6.18	‡ 1.54 1.98	4,309	nw.	26 21	8W. W.	6 11	10,1	9 8
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Lower lake region. Buffalo															27.625														! !	Н	!
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Erie	189	29.20	19 17	29.93	30.35	27 27	29.57 29.64	18 0	79 1 71 4		4. I - 0.2	70.8	7	49.I	22.7 29	35.0	48. I	31.91	3 6.	7.24	75.7	33.2	5.83	+ 1.37	8,372	BW.	36	8. 8W.	I 24	21 24	6 0
Sandusky Toledo	639	29.28	—. 18	29.99	30.43	27 27	29.61 29.61	12,0,	.75 4 .82 4	1.2	0.2	70.0	7	46.8	22.129 24.828 26.426	35.5	45.2	29.9	3 3	8 9	75.2	33.5	2.75	- 0.59	10,060	8W.	38	s. n.	25 IS	18 1	11 1
Detroit	661	29.23	15	29.95	30.37 30.36 30.35 30.35 30.43 30.43 30.43	27 27	29.50	120.	.83 4	2.1	4.5	67.1	7	47.7	28.9 22	37.1	38.2	22.6	7 2	7 9	82.5	37.0	2.19	- 0.82 - 1.09 - 0.71 + 1.37 + 2.11 - 0.59 + 0.24 - 0.31	7,976	BW.		BW. Be.	1 17 1 25 1 24 4 19 25 18 7 18 7 19	22	8 6
Upper lake region.															22.1 27												26	е.	7 19 6 22	1 1	ſ
Grand Haven	608 620	29.27 29.26	—.08 —.13	29.97 29.95	30.39 30.36	27 27	29.49 29.58	70.	.90 3 .78,3	4.6 4.9	- 3.6 - 1.6	49.8 63.5	7	39.2 46.3	21.4 14 25.2 24	30.3	28.4 38.3	14.6 I 26.7 I	0 4. I 3.	5 23 7 20	82.9 77.4	32.2	3.4I 1.63	+ 0.79 - 1.66	6,020 8,538	n. nw.	36	e. W.	6 22 13 16 6 16	22 23	8 0 7 0
Mackinaw City	605 672	29.24 29.19	12 08	29.93 29.96	30.37 30.37	27 27	29.48 29.50	70.	.893 .86 3	7 · I · † 4 · 3 · †	- I.4 - 3.1	59.5 50.7	7	40.7 39.3	27.027 23.3 13 26.6 28	32.9 30.7	32.5 26.7	18.4 14.6	7 3	·7 3	77.8 83.2	30.7 29.5	4 10	一 1.22 十 1.77	7,963 6,347	nw. w.	27	se. ne.	6 16 6 19 19 20	22 27	3 0
Port Huron Chicago	661	29.24 29.25	—. 16 —. 13	29.94 29.98	30.39 30.41	27 27	29.54 29.55	12 0. 6 0.	.86 3 .86 4	2.7 - 1.9 -	- 2.8 - 3.6	66.0	7	43.6 48.7	27.6 14	33.6 36.7	39.6 38.4	27.3 I 23.6 I	3 2. 2 3.	.7 23 .9 5	76.1	34 - 4	3.10 2.33	+ 0.43 - 0.55	7, 581 6, 185	₫, ₩.	24	n. sw.	7 13	24 13	3 4
Milwaukee Duluth	672 672	29.16 29.24	—.15 —.06	29.94 30.02	30.39 30.36 30.37 30.37 30.39 30.41 30.38 30.39	27 23	29. 49 29.52	0.11 0.11	89 3 87 3	7.5 2.2	- 2.6 - 3.2	59.8 43.1	I2 II	43.0 36,6	22.5 14 20.0 27	32.5 28.2	37·3 23.1	20.0 I 18.4 I	2 2	.7 8 .2 _, 30	82.9	32.0 27.5	1.37	- 0.32 + 0.79 - 1.66 - 1.22 + 1.77 + 0.43 - 0.55 - 0.60 - 0.38	8, 450 6, 110	w. nw.		w. ne.	7 13 13 10 6 10	19 1	5 2 2
Extreme northwest.															5.0 73		- 1		- 1	1				i		1	.	n.	7. 8	,,,,	ra E
Moorhead	804 1,694	29.14 28.13	—.03 —.09	30.09 30.06	30.45 30.40	24 30	29.73 29.68	10 0. 11 0.	73 ²	7.6' -	· 8.3	40.2 50.6	10 21	33.1 39.1	0.7 13	20.3	39.5 10.6	24.7 24.9	1 3 8 7.	6 î	83.2 81.7	23.2 25.7	0.66	- 0.47 + 0.67 - 0.05	5,996 4,196	nw.	30	8. n	19 7	17	[O] 3
Fort Totten	I, 930 I, 490	27.88 28.36	— , 12	30.05 30.06	30.39 30.35	30 24	29.68 29.72	21 o.	72 3 62 2	4.0 0.0	- <u>9</u> .1	58.0 43.7	9	42.4 31.9	11.9 13 3.4 14	26.4 20.5	46.1 40.3	27 · 5 24 · 5	8 4. 6 3.	.0 .4 23	86.0 83.7	29.9 21.8	0.56	+ 0.07 - 0.05 + 0.20	4,646 8,933	e. Be.	33 36	W. 88.	29 8 26 4	10 I	9 5
Fort Yates						ا.		٠ا	3	3.1 .,		53.4	ΙÓ	41.Î	11.7 14	25.1	41.2				·I	••••	0.34	+ 0.06					6] .	

Table of miscellaneous meteorological data for November, 1885—Signal Service observations—Continued.

	å		Atmospheric pressure (in inches and hundredths). Temperature of the air (in degrees Fahrenheit).																,													
	92		1	and h	undredths).							eratu	re d		air (in q	egree	Pan	renn	e1t))• —––	_	lity.	ائدا		norm		1.	Winds.				
Stations.	abor el.	r bg.	for .	d ce c	Extremes.			ange ter.		mean.	fom		Extremes.				range.	Dai	aily ranges.			nmig	point	on.	rom.	0 40.	direc		axim elocít	ım. ₹	dy da	days.
	Elevation above level.	Mean actual l	Departure f	Mean reduced	Highest barometer	Date.	Lowest	Date.	Monthly range of barometer.	Monthly n	Departure fron pornial.	Max.	Date.	Mean max	Min. Date.	Mean min.	Monthly re	Greatest.	Date.	Least.	Date.	Mean rel. humidity.	Mean dew-point.	Precipitation,	Departure from normal	Total ment.	Prevailing direc-	Miles p.hr	Direction.	Date.	No. of cloud	No. of fair days.
Upper Mississippi Valley Saint Paul	9-1-	90.06	L ~	2000	20.26		20.47															}- a							ne.			
La Crosse Davenport	725 615	29.10	F.11	29.97	30.34	27 27	29.41 29.42 20.48	70	0.95 0.92 0.88	35.0 38.1	I 4.5	58.0 64.1	11	39.7 44.0	17.2 15 20.8 27 22.7.14	32.6	35.5	29.1 23.7	16	3.8	30 7 30 7	75.6 77.0	29.1 30.8	0.60	- 0.7 - 1.3	4, 030 4, 945 5, 006 4, 124 6, 195	DW.	24 28 30	nw.			13 3 11 4 12 7
Des Moines Dubuque	849 665	29.07	13	29.99	30.42	24 27	29-35	60	0.99	39.2 37.6	2.0	66.3	17	48.0	21.4 I4 19.3 27	32.2	44.9	27.2	10	5.0	19 7	7.2	32.3 30.5	0.61	- 1.9	4, 124	n.	24 16	8. 8.	6	6 12	9 9
KeokukCairo	618 359	29.30 20.65	14 16	30.00	30.35	27	29.41	60	0.94	40.6 48.7	+ 2.0 2.7	73.2 75.6	11	50.7 55.6	22.1 14 27.7 26	32.6	51.1	34.7	12	3.2	197	5.6	32.8	0.88	— 1.2; — 1.2;	6, 19	nw.	28		7	3 10	7 10
Springfield Saint Louis	644 57 L	29.29 29.39	17 16	29.97 30.01	30.32	27	29.41 29.42 29.48 29.35 29.45 29.41 29.58 29.46 29.54	60	o.87 o.78	45.6 47.8	+ 3.8 + 5.0	70.2	II	55.6 56.2	29.8 14 31.8 13	38.c	40.4	28.5 30.5	16 12	7.0	86 24 7	8.1	35.3 38.7	1.44	- 2.00 - 1.0	6,067 6,978 9,000	nw.	33 27 41	ne.	22 6	5 9 7 9	9 9 15 3 7 10 7 9 12 9
Missouri Valley.			1	1	1	1		lí		. 1		1					ŀ		П	- 1		- 1								1 }		
LamarLeavenworth	1,028 842	28.92 29.10	15	30.03	30.38	25 25	29.50 29.36	6	1.03	47.2 43.5	+ 3.5	75.5	17	59.3 53.8	21.625 26.014	36.7 34.0	58.4 49.5	37. o 38.9	10	8.7	29 6 23 6	4.0 7.6	33·7 32·7	0.49 1.86	o.6	7,777 4,463 6,040 7,482 5,442	8W.	37 30	εW. εW.	6	3 5	14 I I 12 I O
Leavenworth	2,603	28.52		30.04	30.39	30	29.30 29.55	6	0.86	39.9 37.3	+ 4.0	68.9	20	50.7	21.5 I4 16.1 8	32.2 27.0	41.6 52.8	24.9 38.6	20 19	7.1	29 E 24 7	0.4	33.9 27.3	0.73	0.0	7,482	nw.		nw. nw.	11	4 8	13 9 12 9 17 7
Fort Sully	1,510	28.30		30.05	30.41		29-55	11	08.0	33.0	+ 4.4	54.4	20	43.0	12.1 8	25.7	42.3	31.3	10	4.5	67	8.5	27.3	0,28	一 o.o: 十 i · i	5,442		44	n.			17 7 15 9
Huron Yankton	1, 307	28.57 28.66	—.og	30.05 30.04	30.40	30 24	29.54 29.34	6 1	.03	30.0 34.8	— 0.4 十 2.7	55.0 67.5	21 10	38.5 45.6	7.8 14 18.4 25	22.8 26.5	47.2 49.1	29.7 35.0	20 16	4·5 7·3	18 18	0.6	21.5 29.1	1.50 2.69	‡ 2:3	5, 467 5, 900	Be.	38 36	ne. nw.	6	3 6 5 8	15 9 10 12
Northern slope. Fort Assinaboine	0 700			2 00 00	20.25	20	29. 65				L,, 8		, 0		-4.6	(.]					1
Fort Assination	2,681	27.02		30.02	30.39	29	29.64	200	3.70 3.75	41.3	T13.8	68.0	10	56.1	14.6 4	25.0 28.0	49.5 52.1	44.8	1	2.7	27 6 8 6	9.6	27.0 31.2	0.65	— 0.95 — 0.14	2,692	øw.	42 32	₩. W.	30	3	14 I I 13 8
Fort Maginnis	4, 340	20.70 25.43		30.00	30.44	29	29.70	4	0.63	39.2 41.1	Ŧ 8:2	72.3 61.5	20	54.0 51.2	9.8 12 20.2 29	25.3 30.2	62.5 41.3	44.0 36.1	I	3.0	21 6 21 5	8.6 7.0	28.5 26.6	0.24	十 0.20	6, 473	se. n.	24 44	n. n.	8	3 9 4 3 6 9	20 7 18 3
Helena	4,044	25.72	<u> </u>	30.05	30.35	30	29.66 29.66	4	5.72 5.78	39.1	T'5:5	60.9	18	47.5	9.2 4 19.8 12	30.9	41.I	30.4	7	9.8	6 10	2.8	28.2 27.1	0.03	+ 0.00 0.50	4,501	sw.	44 36 28	w. sw.	27 2	2 4 5 3 4 8	17 9 23 3 13 3
Deadwood	4,600	27.77 25.30	—.06	30.07	30.43	30	29.73	50	5.70 5.73	32.4 41.0	+ 8.9	63.2	20	50.5	10.230 15.312	21.7 31.4	44.8 47.9	33·7	11	ro.8	67	8.9	26.4 32.0	0.29 I.40	一 0.00 十 0.33	2,859 2,352	w. sw.	36 24	n. sw.	II	6 3	1017
Poplar River † Deadwood Cheyenne North Platte	2,841	23.94 27.02	12	30.08	30.40	30	29.01 29.41	5 1	1.03	39.0 39.5	Ŧ 5:7	63.0	19	51.3 50.8	15.9 12 23.3 13	27.4 30.7	51.2 39.7	42.7 32.2	15	3.2	6 5 27 7	9.9	24.1 33.3	1.71	‡ 2.39	7,846 2,692 4,170 6,473 6,894 4,501 2,859 2,352 8,370 4,637	w.	24 44 40	nw.		5 2 9 9	17 II 3 18
Middle slope.		ĺ	1		1	1	[1 1	- (1	Į Į	l	l i		1	1 1	1	,	١.	١ ١	1	1		1	1		_			
Denver Pike's Peak	14, 134	17.74	-,00	30.19	30.75	9	29.59 29.79 29.46 29.28 29.38	50	0.96	13.8	3.1	33.2	9	18.4	11.2 12 - 9.0 12	8.2	42.2	28.3	7	3.0	5 5 29 8	4.5	25.9 9.8	0.55	— I.O	5, 066 17, 057 4, 499 5, 303 6, 652	w.	35 72	n. nw.		8 o!	7 15 17 13
West Las Animas Concordia Dodge City	1,384	28.50		30.10	30.33	30	29.40	6	1.06	41.8	7 3.0	79.3	10	53.2	19.8 7 24.1 13	31.5	59.5 50.8	52.5 42.7	10	6.0	5 2	4.9	32.0 33.3	0.70	0.5	4, 499 5, 303	e.	44 32 40	n. sw.	¢ ;	6 4 5 8	13 13 12 10
Fort Keno	*******			30.00	30.41		29.30	5].		56.4	T 0.4	84.3	10	67.5	21.2 13 28.5 24	45.4	54 · 3 55 · 8	37.8	13	3.4	20 0	5.2	31.9	1.45	一 0.30 十 1.30	0,052	hw.	40	₩.		2 6 5 ···	12 12
Fort Elliott	2, 650	27.20						5	s	47.4	+ 6.4	83.4	10	62.6 63.6	23.0 I3 ·21.0 I3	34.9 34.3	62.4	46.4	10	3.3	 26 5	5.0	28.3	0.25	- 0.48 - 0.48	6, 581	nw.		nw.	111	7 2 I	11 16
Southern slope, Abilene	1.745	28.22		30,12	30.47	, ,	20.57	5 0	10	56.2		85.8	17	60.7	27.4 13	45.7	-R 4	24.7		7.0	26 6	8 T	44 6	0 22		6. 589	sw.	22	sw.	111	2 2	11 17
Fort Sill	I, 200	28.75	16	30.03	30.37	30	29.39 29.68	50	97	52.0 54.0	‡ 4:8 5:0	84.0 81.5	ΙΊ	66.3	25.0 13 25.0 13	40.1	59.0	42.5	8	3.8	26 5	9.3	34 . 3	1.28	0.75 0.5	6, 890 5, 145	n.	32 38 32	gW.	21	3 2	12 16 9 21
Fort StocktonFort Stanton	3,004	********						-		******	•••••		•••	59.2	15.123						I.						nw.		nw.			
Southern plateau.									l													[11	
El Pato Lava							29.67	5 0	.70	53.8 48.9	+ 3.2	78.3 80.0	10 4	68.0 66.3	23.3 I3 I9.8 I3	39.8 31.6	55.0	40.2	14	[4.2	5 4	3-3	29.4	0.31	0.19	3,098	nw.		710. 			12 16 10 18
Santa F6	7,026 5,050	23.27 25.07	‡:05	30. 12 30. 15	30.37 30.34	30	29.68 29.76	50	.58	40.0 47.5	‡ <u>ફ</u> ે:ફું	62.0 76.6	2	50.7 64.5	20.0 I2 22.5 I3	30.4	42.0 54.1	29.5 45.0	1 1	0.2	21 5 5 5	3.8 9.6	23·5 32·4	1.01	+ 0.10 + 0.59	5, 170 3, 715	n. ne.	31 32	80. 8W.	5	2 5 2 6 3 6	10 18 12 15
Fort Bowie Fort Grant	4,856	25.25		30.06	30.24		29.68	 5	. 56	53.0 54.1	+ 4.1	84.0 76.2	10	64.8	30.0 12 34.0 27	38.9 45.7	54.0 42.2	28.8	13	1.01	5 4	8.9	33.9	1.42	+ 0.76	4,759	n.		 ве.		6 5 4	7 19
Fort McDowell Fort Thomas	2,710	27.27		30.c8	30.30	13	29. 69	5.0	10.0	58.5 51.2	+ 3.2	95.0 80.0	19	74.4	33.0 27 25.8 29	42.7 35.8	62.0 54.2	44.9	14	9.8	. 5 5	9.2	35.1	1.75 0.38	+ 0.04	2, 125	w.		D.		4	9 19
Fort Verde						:::		-		52.4 61.0	十 5.1	82.0 88.0	I	66.2 76.2	26.0 I3 35-9 29																2	
Phœnix Prescott	5, 389	24.74	r	30,12	30.32	30	********	5.0	.64	56.3 44.3	‡ 1.0 3.1	96.2 75.0	3	77.5	31.225 20.812	35.5	65.0 54.2	43-3	 5.1	1.6	 21 7	1.1	33.4	2.46	+ 0.43 1.96	3, 962	B.	33	B.	5	I	 8 20
San Carlos Wickenburg														59.4 68.0 73.7	27.7 28	39.6 37.3	55·7				-			0.70 1.36	+ 0.19 + 0.94	3, 962					. 2	
Yuma				 .		.11	29.56		!	51.1	• • • • • • • • • •	82.0	10	71.0	19.028 41.114	31.2	03.0			*****				0,50		3,886	********	j	nw.	5	- 5 2 I	11 18
Middle plateau. Winnemucca	4, 358	25.58	14	30.10	30.56	30	29.71	40	.85	42.1	+ 6.9	70.8	1	51.8	20.6 14	32.8	50.2	42.8	I	5.1	28 6	4.5	29.5	3.78	+ 3.30	6, 167	sw.	1 1	w.	1	1 1	14 5 11 13
Frisco	4,348	23.68 25.64	12	30.20	30.65		29.71 29.65	0	.86	39·5 43·9	+ 5.2	64.8	9	47.8 53.4	13.6 12	32.7 34.3	51.2 51.3	25.7 31.5	13 1	7.1	26 6 26 6	3.5 8.8	26.3 33.5	3.10	+ 1.63	8, 072 3, 705 4, 020	8W.	42 26	sw. nw.	1 514	3 9	14 7
Montrose Fort Bridger	5, 825	24.32		30.28	30.57	30	29.68	5,0	.90	37.3∣	*******	69.0	2	52.7	13.1 7	25.5	55-9	42.2	2	9.2	26 6	3.0	24.I	0.50		4,020	80.	38	8W.	III 2	7 10	10 10
Cour d'Alene									اا	39.1		60.0	1	46.6	23.0 11					- 1	- [- 1	- 1		+ 2.90	<u> </u>				11	11	
LewistonAshland	78 5	29.12		29.95	30.42	30	29-53	7.0	.894	45.3	† 7⋅3	61.8 66.0	7	52.8	29.3 I5 29.0 3	39.0 38.4	32.5 37.0	22.0	3	7.0	87	8.0	8.4	8.02	+ 0.73	2,010	ne.	20	nw,	2 1	1 10	16 4
Dayton	1.667	28.16				. 1	29.45		[3	37.8		58.0	11	40.3	12.0 12 27.2 15	29.3 35.4	46.0 40.0	35.2		7.7	2 7	6.33	6.5	7.29	+ o.62	3, 355	8W.		6W.	23 14	5 4 I3	 13 4
Fort Spokane Spokane Falls							29.52	¦	3	37 •2∣•	:	50.0	29	45.2	20.0 11	29.5	36.o							2.07		3, 082				. 23	3	16 2
North Pacific coast region Fort Canby	- 1		i l	-		1 1		1		- 1	i	ĺ	2	54.0	41.811			1	- 1		- 1	1	- 1					1 - 1				2 0
Olympia Port Angeles	36	29.76 20.72	−.3 5	29.81	30.26 30.19	30 30	29.07 29.11 29.07	7 T	- T24	12.91		55.43	18 30	51.0 49.4	30.8 21 26.4 21	39.9 34.6	28.4 20.0	21.0 23.1	18 10	5.7 1 5.9 1	59	0.74	3.0	3.00	+ 2.87	13, 197 3, 159 2, 070	9.	31	8. 8W.	18 24	4 20	IO 0 I2 I
Pysht Tatoosh Island					30.17	.i	29.07	7 1	.104	14.9 18.1	••••	57.0 57.8	7	49.9 51.6	31.0 I9 39.1 6	40.0 44.6	26.0 18.7	11.1	 7	3.4	3 8		4.1	3.07		12, 173	80.	1 1		27	7	5
Astoria Portland						. -	29.20		4	0.4		02.0	171	53.D	36.0 19	43.3	20.0					•••• •		2.45		3,761		30		29	9	3
Roseburg Mid. Pacific coast region	5 2 3		•••••		¦	····				•••••]•	•••••	•••••• •			····· ··· ·	• • • • • • • • • • • • • • • • • • • •	•••••	·····/:		·····	-	•••- •	·····¦·			•••••	*******				- -	
Cape Mendocino Red Bluff	637 332	29.20 29.62		29.88 20.08	30.26	29 20	28,88 1 29,42 1 29,46 1 29,42 1	71.	.38 80 5	2.7	F 1.4	67.03	10	58.2 58.5	43.8 23 38.5 13 38.5 13	48.1 46.7	23.2 32.5	13.3 23.5 1	2 (3	7.02	8 8 8 8	5.44	8.5 8.3	7·34	5.95	20, 569 6, 286 5, 985 5, 673	80. 8.	125	86. 8.	23 21 17 21	[20 [15	96
Sacramento	64	29.92	13	29.98	30.27	27 20	29.46	70	.81 .87	4 4 -	2.3	77.0 70.0	7	61.6	38.5 13	48.2 53.0	38.5	28.2	ĭ	4.3	68	1.14	9.2	1.34	10.17	5,985 5,672	80. 80.	36	60. 60.	17 17	7 35 3	II 4 I4 4
South Pacific coast region Los Angeles						1 1		- 1					- 1		· 11				1	- 1			- 1					26		1 - 1	1	1 -
San Diego San Luis Obispo	67 277	29.94 29.60	— .03	29.98 29.06	30.15	26 20	29.70 29.76 29.40	50.	39 5	9.6 6.8	1.3	76.43 81.1	0	67.4 66.7	40.3 15 41.5 26 37.0 14	52.0 49.4	34·9 44.1	28.5 I 36.0 I	3	7.2 5.8	o 8	.95	3.3	I.56-	Ļ ŏ.ŏŏ	4, 702 3, 895 5, 541	nw.	20 44	w. 80.	5 .5	3 3	8 14 13 14 6 13
	-//	-33		-3.30	~9.90	[]	7-4-	1	27/3				1	/		77.7	· · · · · ·		٠٠ '	<u> </u>	1	داندر		الحودث			l	1		11.	1 1	

[•] Record for 29 days.

in the form of an arch, which extended over 30° of the horizon and to an altitude of $12^{\circ}.$

Mackinaw City, Michigan, 9th: at 7.30 p. m. the clouds disappeared in the northern sky, showing an auroral light of 35° altitude and 90° azimuth; it was of a dull gray color; after 9.45 p. m. occasional streamers shot up to an altitude of 75°; at 11.45 p. m. the sky became obscured.

Bismarck, Dakota, 9th: a faint aurora was observed at 8.30

p. m., consisting of a pale yellow light, which extended from 135° to 235° azimuth and to 20° altitude; it attained its maximum brilliancy at 10.05 p. m., and disappeared at 10.50 p. m.

No dark segment was observed.

Moorhead, Minnesota, 9th: a faint auroral arch was observed at 9.30 p. m., consisting of a white light, of 15° altitude, with out streamers.

Fort Yates, Dakota, 9th: a very faint aurora was observed

at 10.00 p. m., the sky being partly obscured.

Fort Totten, Dakota, 9th: auroral light was observed in the north at 9 p. m.; it was obscured by clouds at 10 p. m

Cambridge, Massachusetts: an auroral arch was observed

during the evening of the 9th.

Boston, Massachusetts, 9th: an auroral display was observed from 8.30 to 11 p. m.; it extended from 160° to 225° azimuth and to an altitude of 25°; it was of a pale straw color and was accompanied by "merry dancers."

Albany, New York, 9th: a faint auroral arch of 10° altitude,

extending from 150° to 225° azimuth, was observed at 8.40 p. m.; at 11 p. m. the light became diffused and the northwest portion of the dark segment became detached. The light was of a pale straw color, and disappeared at midnight. streamers appeared. A black cloud extended along the eastern horizon throughout the display.

Escanaba, Michigan, 9th: a bright aurora appeared at 9.08 p. m., consisting of an arch above a bank of clouds; at 10 p. m. a second arch appeared, about 5° above that first observed, with several streamers of bright yellow color. The display

continued until early in the morning of the 10th.

Marquette, Michigan, 9th: an aurora was observed at 10 p. m.; the sky being nearly obscured no special features were noted.

Mackinaw City, Michigan, 10th: a faint auroral light was seen from 6.45 to 8.30 p.m.; altitude, 25°; azimuth, 75°.

was seen at 10 p. m., the display ending at 4 a. m. of the 11th.

Bangor, Maine, 11th.

Fort Buford, Dakota, 11th: an auroral diplay began at 10.14 p. m.; when first observed two streamers, of a whitish color, extended to about 40°; they were nearly stationary, and had a slight reddish hue near the horizon; at 10.40 p. m. the streamers gradually diffused along the horizon to about 8° to 10° altitude and 40° azimuth, between north-northwest and northeast, forming a bank having the appearance of smoke, which continued until 11.10 p.m., after which the aurora gradually disappeared.

Menand Station, New York, 14th: at 9 p. m. three parallel arches, having about 15° altitude and 120° azimuth, extended from north to southeast; the uppermost arch was apparently 3° in width; the lower one exhibited faint lines of light, with-

out motion; the display disappeared at 9.30 p. m.

Cambridge, Massachusetts, 17th: an aurora was suspected at 8.45 p. m.

The following stations report auroras, the observers giving dates only:

6th.—Thornville, Michigan.

-Birmingham, Michigan; Napoleon, Ohio; North Vol-

ney and Ithaca, New York; Beverly, New Jersey.

9th.—Webster, Dakota; Cresco, Iowa; Kent's Hill, Maine; Manistique, Michigan; Embarras, Manitowoc, and Prarie du Chien, Wisconsin; Southington, Connecticut; Riley, Illinois.

10th.—Webster, Dakota; Gardiner, Maine; Westborough, Massachusetts.

11th.—Gardiner and Orono, Maine; Burlington, Vermont.

12th.—Atchison, Kansas; Harvard, Nebraska: Yellow Springs, Ohio.

THUNDER-STORMS.

Thunder-storms were reported in the various states and territories, as follows:

Alabama.—Mobile, 5th, 7th; Birmingham, 6th; Greensborough, 6th, 7th, 22d; Montgomery, 6th, 7th, 23d.

Arizona.—Prescott, 3d; Fort Grant, 3d, 4th.
Arkansas.—Fort Smith, 4th, 5th, 17th; Little Rock, 4th, 5th, 6th, 17th, 18th; Mount Ida, 4th, 5th, 26th, 27th; Lead Hill, 5th, 18th.

California.—Sacramento and College City, 10th; Keeler,

16th: San Rafael, 22d.

Florida.—Limona, 7th, 8th; Sanford, 7th, 19th; Tallahassee, 23d: Key West, 28th.

Georgia.—Forsyth, 6th; Augusta, 6th, 7th; Atlanta, 6th,

7th, 23d; Athens, 6th, 22d.

Illinois.—Chicago and Mattoon, 4th; Sandwick, Windsor, and Charleston, 4th, 6th; Springfield, Cairo, Anna, Geneseo, Sycamore, and Bloomington, 6th; Collinsville, 21st, 22d; Bunker Hill, 22d.

Indiana.—Greencastle, 4th, 6th, 18th; Vevay, Jefferson, Sunman, and Spiceland, 6th; Indianapolis and Guilford, 6th,

7th; Fort Wayne, 6th, 7th, 17th; Laconia, 6th, 22d.

Iowa.—Keokuk, Burlington, Dubuque, Davenport, Independence, Monticello, Manchester, Des Moines, Oskaloosa, and Muscatine, 6th; Cedar Rapids, 6th, 8th.

Kansas.—Ninnescah, 3d, 4th; Allison, 3d, 5th, 30th; Independence and Yates Centre, 4th; Ottawa, 4th, 5th, 18th; Fort

Scott, 17th; Wyandotte, 21st.

Kentucky.-Louisville, 6th; Richmond, 7th, 22d.

Louisiana.-Grand Coteau, 1st, 5th, 6th; Shreveport, 4th, 5th, 6th; New Orleans, 5th.

Maryland.—Ocean City, 8th.

Michigan .- Thornville, 5th; Grand Haven, 6th; Manistique, 6th, 7th; Marquette and Mackinaw City, 7th; Escanaba, 17th. Mississippi.—Vicksburg, 6th, 7th.
Missouri.—Pierce City, 3d to 6th; Conception, 5th; Centre-

ville, 17th; Saint Louis, 22d.

Néw Jersey.—Atlantic City and Dover, 8th. New York.—Mountainville, 8th.

North Carolina.—Fort Macon and Hatteras, 1st; Smithville, Fort Totten, Dakota, 10th: a faint auroral light in the north 1st, 7th; New River Inlet, 2d, 8th, 18th, 19th; Charlotte and Lenoir, 6th; Weldon and Kitty Hawk, 8th.

Ohio.—Fostoria, 5th; Cincinnati, Sandusky, North Lewisburg, Wauseon, Yellow Springs, and Napoleon, 6th; Columbus,

Cleveland, Toledo, Hiram, and Garrettsville, 7th. Oregon.—Albany, 3d, 4th, 5th; Bandon, 17th, 24th. Pennsylvania.—Blooming Grove, 8th.

South Carolina.—Stateburg, 1st, 6th, 7th, 18th; Aiken, 6th, 7th; Spartanburg, 6th, 7th, 8th, 10th, 22d.

Tennessee.-Milan, 5th, 6th, 7th, 18th; Nashville, 6th, 7th; Chattanooga, 6th, 7th, 18th, 22d; Ashwood, 6th, 18th; Knoxville, 6th, 22d.

Texas.—New Ulm, 1st, 3d, 4th, 6th; San Antonio, 3d, 4th; Palestine, 3d, 4th, 5th; Galveston, 3d, 4th, 27th; Cleburne,

4th, 5th, 6th; Rio Grande City, 7th; Brownsville, 27th.

Virginia.—Variety Mills and Wytheville, 6th; Chincoteague and Dale Enterprise, 8th.

Washington Territory. - Pysht, 7th, 8th, 26th; Tatoosh Island, 8th.

West Virginia.—Parkersburg, 6th.

Wisconsin. - Embarras and Manitowoc, 6th; Milwaukee, 6th, 7th.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories, as follows:

Arizona.—1st.

Arkansas.--3d, 17th, 26th.

California.—1st to 4th, 6th, 7th, 23d, 26th, 27th.